

Unit 3

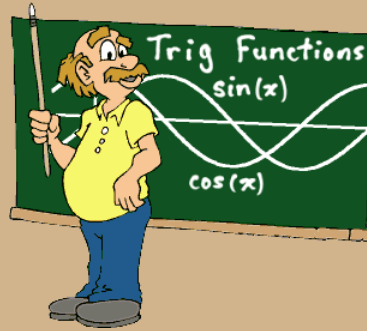
Lesson 1

"Defining Trigonometric Ratios"

If you missed your test on Friday, you **MUST** come today at lunch hour. ALSO, if you wrote in the resource room and did not finish your test, you may come today **ONLY** at lunch hour to finish your test.

12:00 to 12:30

Introduction to Trigonometric Ratios



Vocabulary:

Trigonometry = the branch of Math concerned with the properties of triangles and the calculations based on these.

Trigonometric Functions: used to solve for unknown lengths and angles of right angled triangles. **Sine; Cosine; Tangent**

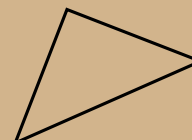
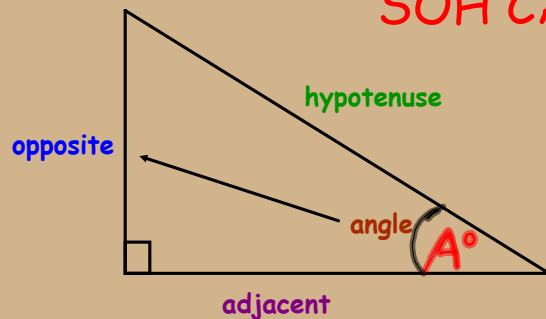
The trig ratios (sine, cosine and tangent) allow you to solve all of the parts of right angled triangles, that is, all 3 sides and all 3 angles, given 2 possible conditions:

1. Given 2 sides OR
2. Given 1 side and 1 of the acute angles.

Trigonometric Functions

Primary Trig Function Name	Ratio	Abbreviation
Sine of Angle A	side opposite to angle A hypotenuse	Sin = $\frac{O}{H}$
Cosine of Angle A	side adjacent to angle A hypotenuse	Cos = $\frac{A}{H}$
Tangent of Angle A	side opposite to angle A side adjacent to angle A	Tan = $\frac{O}{A}$

SOH CAH TOA



SOH CAH TOA

$\sin \theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$
 $\cos \theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$
 $\tan \theta = \frac{\text{Opposite}}{\text{Adjacent}}$

$\tan Q = \frac{O}{A}$

$\sin Q = \frac{O}{H}$
 $\cos Q = \frac{A}{H}$

Finding an Unknown Angle
using Trigonometric Ratios:

Use your trigonometric table to find.

- • $\sin 42^\circ = 0.6691$
 • $\cos 12^\circ = 0.9781$
 • $\tan 29^\circ = 0.5543$

Angle	Sin	Cos	Tan
0°	.0000	1.0000	.0000
1	.0174	.9998	.0175
2	.0349	.9994	.0349
3	.0523	.9986	.0524
4	.0698	.9976	.0699
5	.0872	.9962	.0875
6	.1045	.9945	.1051
7	.1219	.9925	.1228
8	.1392	.9903	.1405
9	.1564	.9877	.1584
10	.1736	.9848	.1763
11	.1908	.9816	.1944
12	.2079	.9781	.2126
13	.2250	.9744	.2309
14	.2419	.9703	.2493
15	.2588	.9659	.2679
16	.2756	.9613	.2867
17	.2924	.9563	.3057
18	.3090	.9511	.3249
19	.3256	.9455	.3443
20	.3420	.9397	.3640
21	.3584	.9336	.3839
22	.3746	.9272	.4040
23	.3907	.9205	.4245
24	.4067	.9135	.4452

Angle	Sin	Cos	Tan
25	.4226	.9063	.4663
26	.4384	.8988	.4877
27	.4540	.8910	.5095
28	.4695	.8829	.5317
29	.4848	.8746	.5543
30	.5000	.8660	.5774
31	.5150	.8572	.6009
32	.5299	.8480	.6249
33	.5446	.8387	.6494
34	.5592	.8290	.6745
35	.5736	.8192	.7002
36	.5878	.8090	.7265
37	.6018	.7986	.7536
38	.6157	.7880	.7813
39	.6293	.7771	.8098
40	.6428	.7660	.8391
41	.6561	.7547	.8693
42	.6691	.7431	.9004
43	.6820	.7314	.9325
44	.6947	.7193	.9657
45	.7071	.7071	1.0000

Please get a trig table handout (do not mark on this)

also, open to a new page in your notes....

Find the angle of the following value using the trig table:

1. $\sin \theta = 0.5878$ $\theta = 36^\circ$ $\sin^{-1}(0.5878)$
 2. $\tan \theta = 1.0000$ $\theta = 45^\circ$
 3. $\cos \theta = 0.0872$ $\theta = 85^\circ$
 4. $\sin \theta = 0.7771$ $\theta = 51^\circ$
 5. $\sin \theta = 0.4695$ $\theta = 28^\circ \checkmark$
 6. $\tan \theta = 0.4425$ $\theta = 24^\circ \checkmark$
 7. $\cos \theta = 0.9945$ $\theta = 6^\circ$
 8. $\sin \theta = 0.9781$ $\theta = 78^\circ$
- $\sin \theta = ?$
 0.1354

Trig Functions

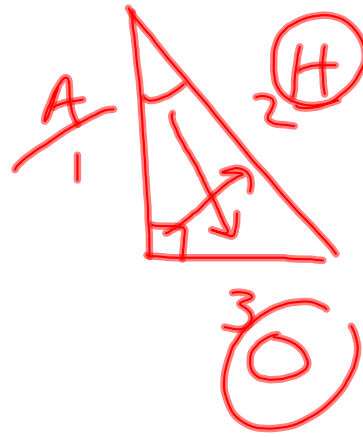
sin cos tan

SOH CAH TOA

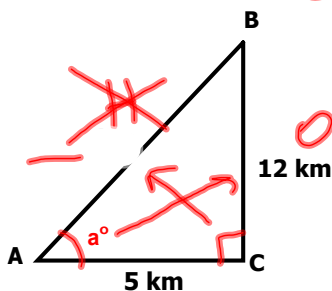
$$\sin Q = \frac{O}{H}$$

$$\cos Q = \frac{A}{H}$$

$$\tan Q = \frac{O}{A}$$



Example 1: Find the primary trigonometric ratios for angle A on $\triangle ABC$



~~SOH~~ ~~CAH~~ TOA
 $\tan Q = \frac{O}{A}$

- Step 1: Label the O, A, H
- Step 2: Choose the correct trig function
- Step 3: Fill in the numbers
- Step 4: Solve for the unknown

$$\Rightarrow \tan Q = \frac{O}{A}$$

$$\tan Q = \frac{12}{5}$$

$$\tan Q = 2.4$$

Use the 2nd function button

$$\tan^{-1}(2.4) = 67.4^\circ$$

Wednesday, May 23

Reminder: You should be finished your take-home assignment Part 1 by tomorrow. Please let me know when you've passed it in and I will give you Part 2. There are 3 Parts!!! Please come for extra help Thursday at lunch hour if you are having any difficulty!

Yesterday: Began Trigonometry lesson and took notes on the 3 primary trig functions. **Please take out your notes from yesterday!!**

Today:

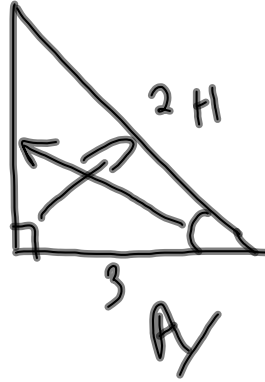
- Review Trig functions and look at some examples
- Practice questions (worksheet)

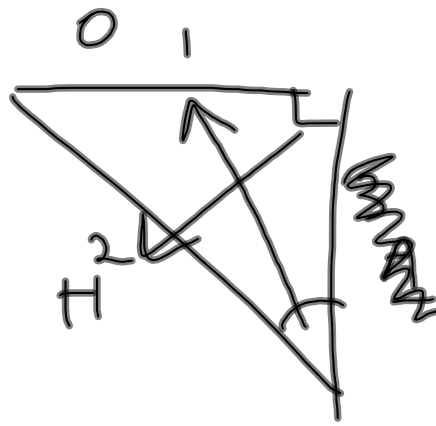
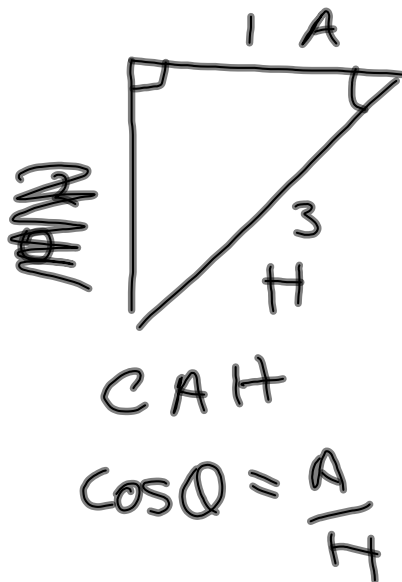
Trig Functions

- sin cos tan - 0, 1

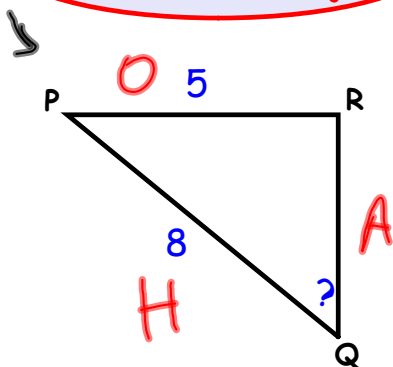
SOH CAH TOA

$\sin Q = \frac{O}{H}$ $\cos Q = \frac{A}{H}$ $\tan Q = \frac{O}{A}$





You Try:



SOH CAH TOA

SOH CAH TOA

Step 1: Label the O, A, H

Step 2: Choose the correct trig function **sin**

Step 3: Fill in the numbers

Step 4: Solve for the unknown

$$\sin Q = \frac{O}{H} \quad \sin Q = 0.625$$

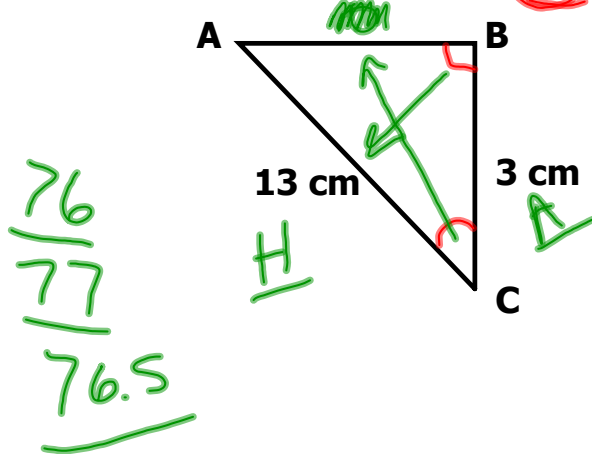
$$\sin Q = \frac{5}{8} \quad Q = \sin^{-1}(0.625)$$

$$Q = 38.7^\circ$$

Practice:

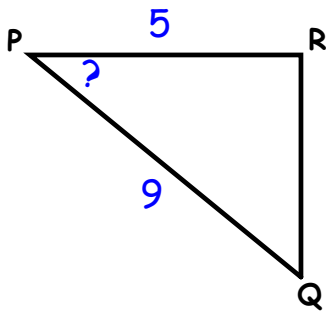
SOH CAH TOA

C. What is the value of $\angle C$.



$$\begin{aligned}\cos Q &= \frac{A}{H} \\ \cos Q &= \frac{3}{13} \\ \cos Q &= 0.23 \\ Q &= \cos^{-1}(0.23) \\ Q &= 76.7^\circ\end{aligned}$$

Practice Question:

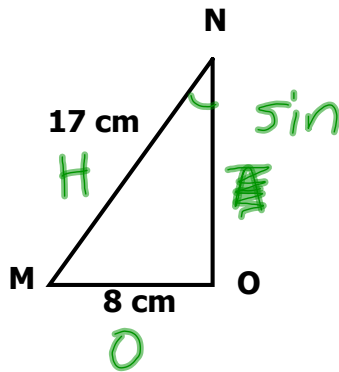


Steps:

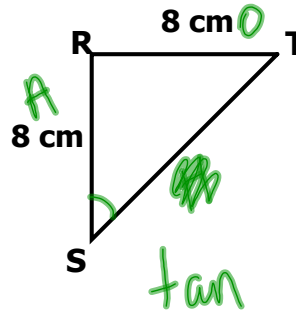
1. Label the O, A, H
2. Cross the one off that does not have a value
3. Choose the correct trig function (SOHCAHTOA)
4. Fill in the numbers
5. Divide the fraction and find the angle using your text

Copy and Complete:

A. What is the value of $\angle N$?



B. What is the value of $\angle S$?



Steps:

1. Label the O, A, H
2. Cross the one off that does not have a value
3. Choose the correct trig function (SOHCAHTOA)
4. Fill in the numbers
5. Divide the fraction and find the angle using your text

NOTE:

- Depending on the side lengths given you need to use either sin, cos, or tan.
- The trig ratios can only be used with right angle triangles.
- Each side length must be in the same units
- For help with any of the questions make sure to refer to the notes for help, as well as the examples

Thursday, May 24

Reminder: You should be finished your take-home assignment Part 1 by today. Please let me know when you've passed it in and I will give you Part 2. There are 3 Parts!!! Please come for extra help today at lunch hour if you are having any difficulty!

Yesterday: Reviewed trig functions, did some examples together, and completed a to g from worksheet

Today:

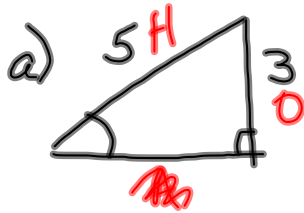
- Check questions from yesterday
- Practice questions (worksheet)

Classwork/Homework

Finish questions a to g on the right side of the worksheet.

Make sure to show all your work on a separate sheet.

You can label the O, A, and H on the worksheet.



SOH CAH TOA

$$\sin \theta = \frac{O}{H}$$

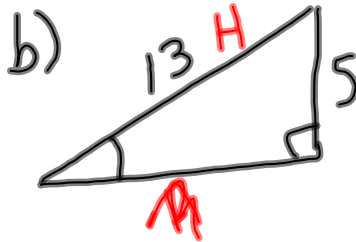
$$\sin \theta = \frac{3}{5} = 0.6$$

$$\theta = \sin^{-1}(0.6)$$

$$\theta = 36.9^\circ$$

O, A, H

SOH CAH TOA



$$\sin \theta = \frac{O}{H} = \frac{5}{13} = 0.38...$$

$$\theta = \sin^{-1}(0.38...) \\ \theta = 22.6^\circ$$

a to g:

SOH CAH TOA



$$\sin \theta = \frac{O}{H} = \frac{3}{5} = 0.6$$

$$\sin \theta = 0.6$$

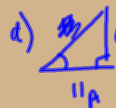
$$\theta = \sin^{-1}(0.6) = 36.9^\circ$$

b) $\sin \theta = \frac{O}{H} = \frac{5}{13} = 0.38$

$$\theta = \sin^{-1}(0.38) = 22.6^\circ$$

c) $\cos \theta = \frac{A}{H} = \frac{4}{7} = 0.5714$

$$\theta = \cos^{-1}(0.5714) = 55.2^\circ$$



$$\tan \theta = \frac{O}{A} = \frac{6}{8} = 0.75$$

$$\theta = \tan^{-1}(0.75) = 36.9^\circ$$

e) $\cos \theta = \frac{A}{H} = \frac{14}{15} = 0.933$

$$\theta = \cos^{-1}(0.933)$$

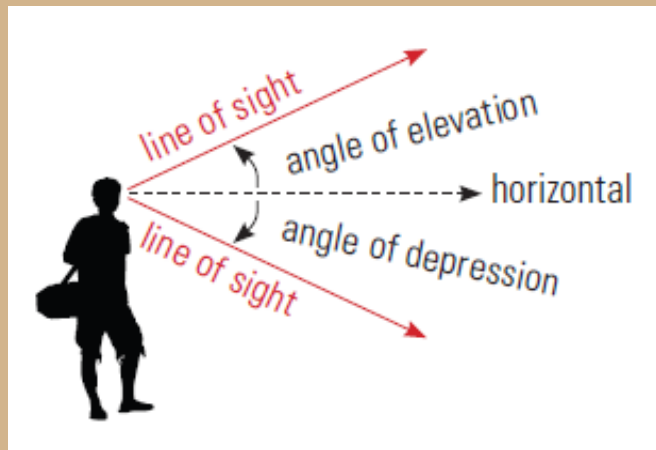
$$\theta = 21.1^\circ \quad 21.0^\circ$$

f) $\tan \theta = \frac{O}{A} = \frac{40}{30} = 1.3$

$$\theta = \tan^{-1}(1.3) = 52.4^\circ \quad 53.1^\circ$$

g) $\cos \theta = \frac{A}{H} = \frac{8}{17} = 0.471$

$$\theta = \cos^{-1}(0.471) = 61.9^\circ \quad 61.96^\circ \quad 62.0^\circ$$



angle of elevation: the angle formed between the horizontal and the line of sight while looking upwards; sometimes referred to as the angle of inclination

angle of depression: the angle formed between the horizontal and the line of sight while looking downwards

Finish the right-side of the worksheet. Remember to show work on a separate sheet for each question

If you finish early, please work on the take-home assignments!!!!

Attachments

Intro. to Trig Pizzazz.pdf